AMENDMENT

In the Claims

Please cancel claims 93-96 and 100 without prejudice.

Please amend claims 88-92, 97-99 and 101 as follows. (Note: Previously-filed claims 88-101 have been renumbered to Claims 89-102 since Applicants inadvertently started that new set of claim entered in the prior preliminary amendment at 88 instead of 89.)

89. (Amended once) A tunable filter apparatus, comprising:

(a) a grid generator to be positioned in an optical path and configured to generate a first plurality of transmission peaks corresponding to channels within a selected wavelength range; and

(b) a channel selector to be positioned in said optical path and configured to generate a second plurality of transmission peaks within said wavelength range, said channel selector including means for tuning the second plurality of transmission peaks relative to the first set of transmission peaks such that a single pair of respective transmission peaks from among the first and second plurality of transmission peaks may be aligned.

90. (Amended once) The apparatus of claim 89, wherein said grid generator has a first free spectral range and said channel selector has a second free spectral range different from said first free spectral range, and wherein tuning is effectuated by shifting the second plurality of transmission peaks relative to the first plurality of transmission peaks to align one of the transmission peaks from the second plurality of transmission peaks with a transmission peak from the first plurality of transmission peaks having a frequency or wavelength corresponding to a selected channel.

91. (Amended once) The apparatus of claim 88, further comprising a gain medium positioned to emit an optical beam along said optical path and receive optical feedback from said grid generator and said channel selector, said grid generator and said channel selector operable to select a wavelength of said optical feedback to said gain medium.

92. The apparatus of claim 91, wherein at least one of said grid generator and said channel selector is configured to operate in transmission.

93. The apparatus of claim 91, wherein at least one of said grid generator and said channel selector is configured to operate in reflection.

98. (Amended once) A method for tuning an optical beam, comprising:

(d) generating a first plurality of transmission peaks corresponding to channels within a selected wavelength range;

(e) generating a second plurality of transmission peaks within said selected wavelength range; and

(f) tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks to tune said optical beam to align one of the second plurality of transmission peaks with one of the first plurality of transmission peaks.

99. (Amended once) The method of claim 98, wherein:

(a) generating said first plurality of transmission peaks comprises positioning a grid generator having a first free spectral range in said optical beam; and

(b) generating said second plurality of transmission peaks comprises positioning a channel selector having a second free spectral range in said optical beam.

100. (Amended once) The method of claim 99, wherein tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks comprises adjusting said second free spectral range with respect to said first spectral range.

102. (Amended once) A tunable filter apparatus for an optical beam, comprising:

(a) grid means for generating a first plurality of transmission peaks corresponding to channels in a selected wavelength range, said grid means to be positioned in said optical beam; and

(b) channel selector means for generating a second plurality of transmission peaks, said channel selector means to be positioned in said optical path and to tune the optical beam by aligning one of the second plurality of transmission peaks with one of the first plurality of transmission peaks.

Please add new claims 103-129

103. (New) The apparatus of claim 89, wherein the first plurality of transmission peaks have a constant free spectrum range and the second plurality of transmission peaks have a variable free spectrum range and tuning is effectuated by adjusting the variable free spectrum range of the second plurality of transmission peaks to align one of the transmission peaks from the second plurality of transmission peaks with a transmission peak from the first plurality of transmission peaks having a frequency or wavelength corresponding to a selected channel.

104 (New) The method of claim 89, wherein tuning said second plurality of transmission peaks with respect to said first plurality of transmission peaks comprises

shifting said second plurality of transmission peaks relative to said first plurality of transmission peaks.

105. (New) The apparatus of claim 89, wherein the grid generator defines a first optical path length determinative of a first free spectral range substantially corresponding to a spacing between adjacent gridlines of the selected wavelength grid.

106. (New) The apparatus of claim 105, wherein the channel selector defines a second tunable optical path length determinative of a second tunable free spectral range which differs from the first free spectral range of the grid generator by an amount substantially equal to the quotient of the first free spectral range divided by one of the number of channels of the selected wavelength grid or the quotient of the first free spectral range divided by a subset of the number of channels of the selected wavelength grid.

107. (New) The apparatus of claim 89, wherein the grid generator and the channel selector comprise at least one of: a Fabry-Perot filter, a diffraction element, and interference element, and a birefringement element.

108. (New) The apparatus of claim 89, wherein the channel selector includes at least one of: a Pockels cell, a Kerr cell, a solid etalon, a gap etalon, and a wedge-shaped etalon.

109. (New) The apparatus of claim 89, wherein the channel selector includes at least one of a tunable length and a tunable index of refraction.

110. (New) The apparatus of claim 89, wherein the tuning of the channel selector is effected by a selected one of: a mechanical actuator, a thermal actuator, an electro-optical actuator, and a pressure actuator to tune the second plurality of transmission peaks.

111. (New) The apparatus of claim 89, wherein the channel selector comprises:

a gas spaced etalon tunable by adjusting a pressure of a gas within the etalon to vary an optical path length thereof.

112 (New) The apparatus of claim 89, wherein the channel selector comprises:

an etalon responsive to an applied electric field to vary an optical path length thereof.

113. (New) The apparatus of claim 89, wherein the channel selector comprises:

an etalon responsive to an applied thermal energy to vary an optical path length thereof.

114. (New) The apparatus of claim 89, wherein the channel selector comprises:

a semiconductor element with a tunable index of refraction responsive to an applied electric field or current to vary an optical path length thereof.

115. (New) The apparatus of claim 89, wherein the channel selector comprises:

a grating; and

an actuator for varying an angle between the grating and the optical beam to tune the optical beam to selected channels of the wavelength grid.

116. (New) The tunable laser of claim 89, wherein the grid generator comprises:

an etalon; and

a thermal controller to control a temperature of the etalon to maintain the substantial alignment of the first set of transmission peaks with the corresponding channels of the selected wavelength grid.

117. (New) A method for tuning an optical beam, [emitted by a gain medium comprising the acts of] comprising:

filtering the optical beam to define a first plurality of pass bands substantially aligned with corresponding channels in a selected wavelength grid having a wavelength range;

filtering the optical beam to define a second plurality of pass bands within the selected wavelength grid; and

tuning the second plurality of pass bands with respect to the first plurality of pass bands to select channels at which to tune the optical beam, wherein the optical beam is tuned to a channel when one of the pass bands in the second plurality of pass bands is aligned with a pass band in the first plurality of pass bands corresponding to a selected channel.

118. (New) The method of claim 117, further comprising:

emitting the optical beam via a gain medium; and

optically providing feedback to the gain medium corresponding with the first and second plurality of pass bands.

119. (New) The method of claim 117, wherein the tuning further comprises:

shifting the second set of pass bands across a wavelength range substantially equal to one channel spacing within the wavelength grid to tune channels throughout the selected wavelength grid.

120. (New) The method of claim 117, wherein the tuning further comprises:

selecting either subsets of channels throughout the wavelength grid or discrete channels throughout the wavelength grid.

121. (New) The method of claim 117, wherein the filtering the optical beam to define a first set of pass bands comprises:

generating a first interference within the optical beam with a first free spectral range subsequently corresponding to the selected wavelength grid.

122. (New) The method of Claim 121, wherein the filtering the optical beam to define a second set of pass bands comprises:

generating a second interference within the optical beam with a second free spectral range which differs from the first free spectral range by an amount substantially equal to the quotient of the first free spectral range divided by one of the number of channels of the selected wavelength grid or the quotient of the first free spectral range divided by a subset of the number of channels of the selected wavelength grid.

123. (New) The method of claim 117, wherein the first plurality of pass bands have transmission peaks defining a first free spectrum range and the second plurality of pass bands have transmission peaks defining a second free spectrum range and tuning is accomplished by shifting the second plurality of pass bands relative to the first plurality of pass bands to align one of the transmission peaks from the second plurality of pass bands with a transmission peak from the first plurality of pass band having a frequency or wavelength corresponding to the selected channel.

124. (New) The method of claim 117, wherein the first plurality of pass bands have transmission peaks defining a first constant free spectrum range and the second plurality of pass bands have transmission peaks defining a second free spectrum range that may be varied, and tuning is accomplished by adjusting the second free spectrum range to align one of the transmission peaks from the second plurality of pass bands with a transmission peak from the first plurality of pass bands having a frequency or wavelength corresponding to the selected channel.

125. (New) The apparatus of claim 102, wherein the first plurality of transmission peaks have a first free spectrum range and the second plurality of transmission peaks have a second free spectrum range and the channel selector means includes:

means for shifting the second plurality of transmission peaks relative to the first plurality of transmission peaks to align one of the transmission peaks from the second plurality of pass bands with a transmission peak from the first plurality of pass band having a frequency or wavelength corresponding to a selected channel.

126. (New) The apparatus of claim 102, wherein the first plurality of transmission peaks have a first constant free spectrum range and the second plurality of transmission have a second free spectrum range that may be varied, and the channel selection means includes:

means for adjusting the second free spectrum range to align one of the transmission peaks from the second plurality of transmission peaks with a transmission peak from the first plurality of transmission peaks having a frequency or wavelength corresponding to a selected channel.

127. (New) A communication apparatus, comprising:

a first optical circulator having a first port for receiving an input optical beam, a second port from which a filtered portion of the input optical beam is emitted, and a third port from which a non-filtered portion of the input optical beam is emitted; and

a tunable filter including:

a grid generator positioned in an optical path of the filtered portion of the optical beam and configured to generate a first plurality of transmission peaks corresponding to channels within a selected wavelength grid;

a channel selector positioned in the optical path and configured to generate a second plurality of transmission peaks within a wavelength range corresponding to the selected wavelength grid; and

a second optical circulator, disposed in the optical path downstream of the tunable filter, having a first port for receiving an optical beam passing through the tunable filter, a second port from which an output optical beam is emitted, and a third port coupled to the third port of the first optical circulator to receive the non-filtered portion of the input optical beam,

said tunable filter to tune to a selected channel from among channels defined by the selected wavelength grid, said filtered portion of the input optical beam corresponding to the selected channel.

128. The apparatus of claim 127, wherein the channel selector comprises a channel tuner operatively coupled to control an optical characteristic of an optical element that generates the second plurality of transmission peaks.

129. The apparatus of claim 128, wherein the grid generator includes a grid controller operatively coupled to control an optical characteristic of an optical element that generates the first plurality of transmission peaks.